

a polyester resin which has gasoline resistance is taught by the Lee et al patent and therefore its use in the hose according to the Smith et al patent would be obvious to one of ordinary skill in the art. Further, it was asserted that (2) the use of a polyester resin material for another layer is taught by the Kawazura et al patent and therefore its use in the hose according to the Smith et al patent would be obvious to one of ordinary skill. Reconsideration of this rejection in view of the following comments is respectfully requested.

Before discussing the rejection in detail, a brief review of the presently claimed invention may be quite instructive. As recited in amended claim 1, the invention relates to a fuel hose having a plural layer structure, at least an inner layer comprising at least one first polyester resin selected from the group consisting of polybutylene terephthalate, polybutylene naphthalate, polyethylene terephthalate and polyethylene naphthalate. The inner layer further includes particles each having a core-shell structure, the particles being present in a proportion of 5 to 60 parts by weight based on 100 parts by weight of the polyester resin. In the subject fuel hose, layers other than the layer comprises the first polyester resin and the particles comprising a polyester resin material.

An important feature of the structure of the fuel hose as claimed, among others, is that at least the inner layer of the fuel hose is composed of a material containing 5 to 60 parts by weight of particles each having a core-shell structure in a specifically recited PBT

or PBN polyester resin. As a consequence of this structure, the fuel hose is less permeable to fuel, and has excellent sour gasoline resistance and low-temperature flexibility. Since the layers other than the layer comprising the first polyester resin and the particles blended in the specific proportion comprise a polyester resin material, the layers can be adhered to each other without an adhesive agent, which is advantageous in terms of operability and productivity. It is submitted that such a fuel hose is not taught or suggested by the patents to Smith et al, Lee et al, and Kawazura et al, whether taken singly or in combination.

More particularly, the Smith et al patent relates to a fuel transport hose constructed of a polyalkylene terephthalate or a polyalkylene naphthalate. However, if an inner layer of a fuel hose is formed with polyalkylene terephthalate such as PBT or polyalkylene naphthalate such as PBN, such an inner layer is very hard and may have a defect such as a craze, which deteriorates the low fuel permeability. These disadvantages are clearly shown in the results of Comparative Examples 1 and 2 in the present specification.

More particularly, the inner layer according to Comparative Example 1 is formed solely with PBT and the inner layer according to Comparative Example 2 is formed solely with PBN. It is to be noted that each had cracks from which gasoline leaked, thereby deteriorating fuel permeability of the hoses.

In distinct contrast, the fuel hose of the presently claimed invention achieves advantageous low fuel permeability by reinforcing the polyester resin such as PBT and/or PBN (Component A) by blending particles each having a core-shell structure (Component B) into the Component A in a specific proportion. The Smith et al patent does not teach or suggest, among other things, the inclusion of "particles each having a core-shell structure" as presently claimed. It is submitted that these teaching deficiencies are not supplied by the Lee et al patent.

More particularly, the Lee et al patent discloses a polyamide resin composition which comprises, on the basis of 100 parts by weight of the whole resin composition: (A) 45-70 parts by weight of polyamide resin; (B) 15-35 parts by weight of impact resistant component such as ethylene propylene copolymer rubber (EPM), ethylene propylene diene monomer rubber (EPDM), or styrene butadiene rubber (SBR); (C) 5-15 parts by weight of plasticizer; (D) 0.1-3 parts by weight of thickener; and (E) 0.5-5 parts by weight of core-shell rubber. Further, the Lee et al patent describes that the polyamide resin may include polyethylene terephthalate (PET) and polybutylene terephthalate (PBT) in addition to a polyamide component. Allegedly, these polyamide resin compositions of the Lee et al patent provide synthetic resin products having flexibility, impact resistance, preferred external appearance, and improved operability.

However, it is to be specifically noted that the Lee et al patent fails to teach or

suggest that, among other things, the core-shell rubber is present in a proportion of 5 to 60 parts by weight based on 100 parts by weight of the polyester resin such as PBT and PBN. Further, the Lee et al patent fails to teach or suggest that a material comprising polyester resin and core-shell rubber is used for an inner layer of a fuel hose which is to be in contact with fuels such as gasoline. Additionally, the Lee et al patent fails to disclose that layers other than a layer comprising polyester resin and core-shell rubber comprise a polyester resin material.

The polyamide resin composition of the Lee et al patent essentially comprises impact resistant component, plasticizer, and thickener. In contrast, the inner layer of the fuel hose of the presently claimed invention substantially comprises a specific polyester resin (Component A) and particles each having a core-shell structure (Component B. As a consequence, the subject fuel hose composition does not require a large amount of impact resistant component (15-35 parts by weight) as well as plasticizer and thickener.

In summary, while the Lee et al patent describes a hose for motor vehicles prepared from the polyamide resin composition, there is no teaching in the patent regarding materials forming each layer of the hose or their proportions in a fuel hose. That is, the Lee et al patent does not teach the use of the polyester resin composition as an inner layer material of a hose for motor vehicles nor is there a teaching or suggestion in the Lee et al patent regarding the use of PET and PBT as the inner layer material and their combination

with particles each having a core-shell structure.

It is further submitted that the above-noted teaching deficiencies of the Smith et al and Lee et al patents are not supplied by the cited Kawazura et al patent. More particularly, the Kawazura et al patent discloses that a hose having an inner layer and/or outer layer composed of a thermoplastic elastomer composition comprising 30 to 90% by weight of thermoplastic copolyester elastomer and 10 to 70% by weight of acrylic rubber, based upon 100% by weight of the rubber component. However, the Kawazura et al patent does not teach or suggest that the inner layer of a hose comprises the thermoplastic copolyester elastomer and rubber having core-shell structure as presently claimed. Also, the proportion of the above components is not disclosed either in the Kawazura et al patent.

It is further submitted that one of ordinary skill in the art would not be led to combine the respective teachings of the Smith et al, Lee et al and Kawazura et al patents. In this regard, it is to be emphasized that the Lee et al patent primarily relates to a polyamide resin composition, while the Smith et al patent relates to a fuel transport hose constructed of a specific polyester resin such as a polyalkylene terephthalate or a polyalkylene naphthalate. Since a polyamide resin and a polyester resin are completely different from each other, one of ordinary skill in the art could not predict the combination of these two resins.

Therefore, it is submitted that one of ordinary skill in the art would not recognize that the particles according to the Lee et al patent could be used in a polyester hose according to the Smith et al patent, since the Lee et al patent is directed to primarily is directed to a polyamide composition whereas the hose of the Smith et al patent is a specific polyester. The mere fact that the polyamide composition containing core-shell particles of the Smith et al patent may contain a polyester would not suggest to one of ordinary skill that such particles could be incorporated into the polyester resin used in the hose according to the Lee et al patent. Consequently, one of ordinary skill in the art would have no motivation to combine the teachings of the cited patents in the manner attempted in the rejection.

In the subject Action, it was asserted in response to the above argument that the core-shell particles will impart the same properties to the polyamide composition of the Lee et al patent as these particles would to the polyester composition of the Smith et al patent. Consequently, it was concluded that one of ordinary skill in the art would be motivated to combine the teachings of the two cited patents in the manner of the rejection.

In response, it is submitted that one of ordinary skill in the art would not be motivated to combine the teachings of the cited patents as alleged in the Action. It is acknowledged that the Lee et al patent teaches polyamide compositions suitable for fuel lines and the like where core-shell particles are incorporated therein for the purposes of improving (1) the external appearance of a molded product, (2) elongation under tension

and (3) impact resistance under cold environment as is set forth on lines 10-13 of column 5 thereof. On the other hand, the Smith et al patent is directed to the use of a polyalkylene terephthalate material or a polyalkylene naphthalate material as an inner layer material for a fuel hose so as to prevent permeation of fuel liquid and vapor as is set forth on lines 37-40 of column 1 thereof.

There is no recognition whatsoever in the Smith et al patent that it is necessary or even preferable to have the inner layer for a fuel hose exhibit improved (1) external appearance of a molded product, (2) elongation under tension and (3) impact resistance under cold environment. Consequently, it is submitted that one of ordinary skill in the art, who was aware of the teachings of the Lee et al and Smith et al patents, would have no motivation to utilize core-shell particles of the former patent in the inner layer of the fuel hose of the latter patent.

More particularly and as discussed above, the Lee et al patent teaches a polyamide resin composition in which a core shell type rubber is blended in a polyamide resin. However, the core shell type rubber is used in order to improve external appearance of molded products, elongation under tension, impact resistance under cold environment as is set forth in column 5, lines 10 to 13 thereof.

The Smith et al patent teaches that polyalkylene terephthalate or polyalkylene

naphthalate is used as a material of the inner layer in order to prevent permeation of fuel liquid and vapor as is set forth in column 1, lines 37 to 40 thereof. However, the Smith et al patent does not disclose or suggest the purposes of improving external appearance of molded products, elongation under tension, impact resistance under cold environment. Therefore, one of ordinary skill in the art would not have anticipated the use of a core shell type for the above-mentioned purposes such as improvement of external appearance of molded products.

Although the Lee et al patent discloses that the polyamide resin composition essentially comprises 15-35 parts by weight of impact resistant component, 5-15 parts by weight of plasticizer, and 0.1-3 parts by weight of thickener, in addition to 45-70 parts by weight of polyamide resin and 0.5-5 parts by weight of core-shell rubber, the Smith et al patent does not disclose the use of polyamide resin instead of polyalkylene terephthalate or polyalkylene naphthalate and the use of impact resistant component, plasticizer, and thickener in addition to polyalkylene terephthalate or polyalkylene naphthalate.

Further, although the Lee et al patent discloses a large amount of (15-35 parts by weight) impact resistant component such as EPM is essentially used in addition to polyamide resin, this patent does not disclose or suggest that polyalkylene terephthalate or polyalkylene naphthalate is used as an essential component instead of the polyamide resin and the impact resistant component. Therefore, a simple combination of the



teachings of the Lee et al and the Smith et al patents would not yield the presently claimed invention. Further, where a material containing a large amount of impact resistant component (15 to 35 parts by weight) as disclosed by the Lee et al patent is used for forming an inner layer of a fuel hose, it is apparent that the material will cause deterioration of low fuel permeability and sour gasoline resistance properties. As a consequence, the effects of the fuel hose as presently claimed would not be achieved.

As mentioned above, the Kawazura et al patent discloses that an inner layer and/or outer layer of a hose is composed of a thermoplastic elastomer composition comprising 30 to 90 % by weight of thermoplastic copolyester elastomer and 10 to 70 % by weight of acrylic rubber, based upon 100 % by weight of the rubber component. Where a material essentially containing a large amount of the acrylic rubber (10 to 70 % by weight) together with the thermoplastic copolyester elastomer as disclosed by the Kawazura et al is used for forming an inner layer of a fuel hose, it is apparent that the material will have deteriorated low fuel permeability and sour gasoline resistance properties. Therefore, the effects of the fuel hose of the presently claimed invention would not be achieved.

Accordingly, withdrawal of the rejection under 35 U.S.C. § 103(a) and allowance of claims 1, 2 and 6-8 as amended over the cited patents are respectfully requested.

Claim 5 was rejected under 35 USC § 103(a) as being unpatentable over the same

patent to Smith et al in view of the patent to Lee et al further in view of the patents to Kawazura et al and Shah et al. In addition, claim 5 also was rejected under 35 USC § 103(a) as being unpatentable over the same patent to Smith et al in view of the patent to Lee et al further in view of the patents to Kawazura et al, Gilbert et al and Han et al. In each of the rejections, the first three cited patents were relied upon as in the initial rejection, and the additionally patent or patents were cited for allegedly showing the use of an amine-rich resin for promoting adhesion between polymeric layers. Reconsideration of these rejections in view of the following comments is respectfully requested.

The above remarks relative to the teaching deficiencies of the patents to Smith et al, Lee et al and Kawazura et al are reiterated with regard to this rejection. Thus, the same considerations as were set forth above are applicable to this rejection as well. It is further submitted that the patents to Shah et al, Gilbert et al and Han et al, whether taken singly or in combination, do not supply these teaching deficiencies. Among other things, it is submitted that none of the patents to Shah et al, Gilbert et al and Han et al teach an intermediate layer of polybutylene terephthalate, polybutylene naphthalate, polyethylene terephthalate and polyethylene naphthalate having a layer provided on the outer peripheral surface of an amine-rich resin as is recited in claim 5.

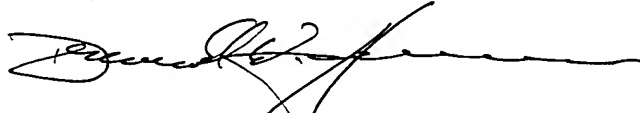
For the reasons stated above, withdrawal of the rejection under 35 U.S.C. § 103(a) and allowance of claim 5 over the cited patents are respectfully requested.

In view of the foregoing, it is submitted that the subject application is now in condition for allowance and early notice to that effect is earnestly solicited.

In the event this paper is not timely filed, the undersigned hereby petitions for an appropriate extension of time. The fee for this extension may be charged to Deposit Account No. 01-2340, along with any other additional fees which may be required with respect to this paper.

Respectfully submitted,

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